WHAT IS CLAIMED IS:

1. Local oscillator for generating a narrow-band HF signal for direct mixing with a reception signal generated by a reverse-biased avalanche photodiode (APD 2) from a light signal impinging on the latter, wherein a depletion layer capacitance (C_{APD}) of the avalanche photodiode (APD 2) is incorporated in a controllable HF resonant circuit whose circuit whose resonant frequency forming the HF signal is determined by selective adjustments of a control unit which is acted upon by a reference oscillator (6).

2. Local oscillator according to claim 1, wherein a control unit is a PLL-circuit (1) for frequency regulation and phase regulation, whose adjustable divider ratio, together with a frequency of the reference oscillator (6), determines the frequency of the HF resonant circuit.

3. Local oscillator according to claim 2, wherein the control unit is a digital calculating unit which adjusts the frequency of the HF resonant circuit with control signals generated by the calculating unit and determines an actual value of the frequency of the HF resonant circuit based on the frequency of the reference oscillator.

4. Local oscillator according to claim 3, wherein the digital calculating unit determines the reference value of the frequency of the HF resonant circuit based on the frequency of the reference oscillator (6) and the determined actual value of the frequency of the HF resonant circuit via a regulator and control signals generated by the digital calculating unit.

5. Local oscillator according to claim 4, wherein the regulator is realized by a computing program.

6. Local oscillator according to claim 2, wherein the HF resonant circuit is a HF resonant circuit with a controllable capacitance (C), the HF resonant circuit being connected in parallel or in series with the depletion layer capacitance (C_{APD}).

7. Local oscillator according to claim 6, wherein the controllable capacitance is a capacitance diode (3).

8. Local oscillator according to claim 2, wherein the HF resonant circuit is a HF resonant circuit with a controllable inductance and connected in parallel or in series with the depletion layer capacitance (C_{APD}).

9. Local oscillator according to claim 2, wherein the HF

resonant circuit is formed by a resonator and at least one of controllable capacitance and controllable inductance, together with the depletion layer capacitance (C_{APD}) of the avalanche photodiode (APD 2).

10. Local oscillator according to claim 9, wherein the resonator is one of an LC series resonant circuit and an LC parallel resonant circuit.

11. Local oscillator according to claim 9, wherein the resonator is a cavity resonator.

12. Local oscillator according to claim 9, wherein the resonator is a conducting resonator.

13. Local oscillator according to claim 9, wherein the resonator is one of a quartz resonator and a SAW (surface acoustic wave) resonator.

14. Local oscillator according to claim 9, wherein the resonator is a dielectric ceramic resonator.

15. Local oscillator according to claim 2, further including a feedback amplifier (4, 5) connected with the HF resonant circuit for compensating losses and for maintaining an oscillation of constant amplitude of

the HF resonant circuit.

16. Local oscillator according to claim 1, including a low-pass (7) connected with a mixing signal output of the avalanche photodiode and which has a cutoff frequency above a desired IF signal.

17. Local oscillator according to claim 1, wherein another avalanche photodiode (APD 10), which is likewise reverse-biased and enerates a second reception signal to be converted by direct mixing into another frequency range, and a depletion layer capacitance ($C_{APD,M}$) of which is connected in parallel with the depletion layer capacitance ($C_{APD,R}$) of the first avalanche photodiode (APD 2) and with a LC resonant circuit.

18. Local oscillator according to claim 1, wherein another avalanche photodiode (APD 10), which is likewise reverse-biased and which generates a second reception signal to be converted by direct mixing into another frequency range, and a depletion layer capacitance ($C_{APD,M}$) of which is connected in parallel with the depletion layer capacitance ($C_{APD,R}$) of the first avalanche photodiode (APD 2), wherein a total capacitance ($C_{APD,M} + C_{APD,R}$) of the parallel circuit is connected in series with a LC series resonant circuit.

19. Local oscillator according to claim 1,wherein another avalanche photodiode (APD 10), which is likewise reverse-biased and generates a second reception signal to be converted by direct mixing into another frequency range, and depletion layer capacitance ($C_{APD,M}$) of which is connected in series with a depletion layer capacitance ($C_{APD,R}$) of the first avalanche photodiode (APD 2) and with a LC series resonant circuit.

20. Local oscillator according to claim 1,wherein another avalanche photodiode (APD 10) which is likewise reverse-biased and generates a second reception signal to be converted by direct mixing into another frequency range, and a depletion layer capacitance ($C_{APD,M}$) of which is connected in series with the depletion layer capacitance ($C_{APD,R}$) of the first avalanche photodiode (APD 2), wherein a total capacitance of the series circuit is connected in parallel with a LC parallel resonant circuit.